



# Systems Engineering: *Past, Present, and Future*

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# NDIA SE Conference 2003

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- Program challenges and opportunities
- OSD(AT&L) Three Imperatives
- Defense Systems responded by establishing Systems Engineering organization
  - Enterprise Development
  - Developmental Test and Evaluation
  - Assessments and Support

**“Help drive good systems engineering practice back into the way we do business.”**



# The Challenges

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- Challenges to revitalize SE within DoD
  - Identify and make policy, processes, methods, and tools changes necessary to enhance SE effectiveness
  - Review and update education and training to incorporate SE best practice
  - Develop and use common methodology for program support
  - Engage and obtain industry and academia counsel as we revitalize SE in the Department



# DoD Response Policy and Guidance

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- OSD(AT&L) Policy Memo of February 20, 2004
  - Programs shall apply robust SE approach and develop a SE Plan
  - Defense Systems shall assess adequacy of policies, guidance, and education and training and recommend necessary changes
  - Defense Systems shall establish a SE Forum
  - OSD shall review program SEPs for ACAT ID and IAM programs
- OUSD(AT&L)/Defense Systems SE Plan Guidance of March 30, 2004
- SE Chapter (4) and T&E Chapter (9) in *Defense Acquisition Guidebook*
- SE Plan Preparation Guide, Version 0.90

**<http://www.acq.osd.mil/ds/se>**



# DoD Response Education and Training

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- Updating formal training updates across career fields: SE, Acquisition, Program Management, Contract Management, Finance Management
- Developing continuous learning, on-line courses: Reliability and Maintainability, Technical Reviews, and System Safety
- Engaging universities



# DoD Response Program Support

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- “Drive SE back into programs:”
  - Developed tailorable, common assessment process—Defense Acquisition Program Support (DAPS)
  - Assembled and trained OSD technical staff
  - Provides OSD decision makers timely, accurate, and complete information for ad hoc reviews, OIPTs, DABs, and DAES

**Systemic feedback will drive future policy, guidance, education, and training updates**



# DoD Response

## Developmental Test and Evaluation

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- Roughly 75% of Life Cycle Cost is set by initial design process...the longer it takes to discover and correct problems, the greater the impact
- A robust DT&E program can save money in the long run
  - Positive results give you confidence in design
  - Bad news, discovered early and corrected, gives you a better product, earlier
- Merged DT&E with SE for all program support efforts
  - Integrated engineers with T&E experience into program support efforts to bring their expertise to bear earlier
- Established T&E subgroup to NDIA Systems Engineering Division

**Key part of SE process—the “feedback loop”**



# DoD Response Modeling and Simulation

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- Acknowledged as essential element of SE
  - Senior level DoD interest in M&S
  - Obstacles identified in NDIA report (Feb 2004) preclude fully effective and efficient M&S use
- Department-wide initiative to improve M&S utility
  - Address policy, technology, and culture—including industry role
  - Establish DoD Acquisition M&S Working Group to focus effort



# DoD Response Safety

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- Established Defense Safety Oversight Council in 2003
  - Promote development and implementation of safety initiatives
- OSD(AT&L) System Safety Memo of September 23, 2004, program managers shall:
  - Integrate system safety risk management into overall SE process
  - Use MIL-STD-882D in developmental and sustaining engineering activities
  - Ensure ESOH risk management strategy is incorporated in SE Plan
  - Identify, assess, mitigate, and report ESOH risks during technical reviews



# New Challenges

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- Applying SE to family-of-systems, system-of-systems, and capability-based acquisition
- Modeling and simulation and SE
- Contracting for SE
- Determining value of effective application of SE



# Systems Engineering Today and Tomorrow

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- Is Systems Engineering still relevant? Absolutely
- Has the role of SE changed? Absolutely
- Are there new challenges? Absolutely
- Does industry have a role in the evolution of DoD's SE challenges? Absolutely
- Does SE Education and Training need to change? Absolutely
- Do we have all the answers? Absolutely not!

**It's a great time to be engaged with  
Systems Engineering!**



# Revitalization of Systems Engineering Plenary Session

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- Mr. Jon Ogg, Director, Engineering Management and Technology, HQ AFMC, USAF
- Mr. John McKeown, Director, SE, JSF Program
- Col James Horejsi, USAF, Chief Engineer, Space and Missile Systems Center
- Mr. Carl Siel, Deputy ASN (RDA/CHENG)
- Mr. Doug Wiltsie, Assistant Deputy for Acquisition and Systems Management, ASA (ALT)